sexes

MDPI

Article

Automatic Distraction by Sexual Images: Gender Differences

Robert J. Snowden [1,*], Poppy Midgley [1] and Nicola S. Gray [2,3]

[1] School of Psychology, Cardiff University, 70 Park Place, Cardiff CF10 3AT, UK
[2] Department of Psychology, Swansea University, Singleton Park, Swansea SA2 8PP, UK; nicola.s.gray@swansea.ac.uk
[3] Caswell Clinic, Glanrhyd Hospital, Swansea University Health Board, Tondu Road, Bridgend CF31 4LN, UK
* Correspondence: snowden@cardiff.ac.uk

Abstract: Sexual stimuli are thought to be highly salient and have been shown to automatically attract attention at the cost of processing other stimuli. We examined whether this effect was greater for men and whether men would show a category-specific effect with greater effects due to female images than male images. In two studies, participants performed a simple perceptual task while trying to ignore a distractor stimulus that could have sexual or neutral content. As expected, sexual stimuli produced a slowing of decision times under all conditions. The effect of erotic stimuli was greater for men (Experiment 1) and was category-specific (Experiment 2) while the response of women was not category specific (Experiment 2). However, all indices of distraction showed poor levels of reliability. The results show that early automatic distraction from sexual images show both quantitative and qualitative gender differences.

Keywords: sexual stimuli; sexual-content-induced delay (SCID); distractibility; gender differences

Citation: Snowden, R.J.; Midgley, P.; Gray, N.S. Automatic Distraction by Sexual Images: Gender Differences. *Sexes* **2024**, *5*, 778–795. https://doi.org/10.3390/sexes5040050

Academic Editor: David L. Rowland

Received: 2 August 2024
Revised: 19 November 2024
Accepted: 11 December 2024
Published: 16 December 2024

1. Introduction

Stimuli that are emotionally or motivationally charged appear to gain privileged access to processing resources in humans. For instance, in comparison to a non-threatening scene, an image that depicts a threatening scene is found more swiftly [1], draws attention to its location [2], and is more distracting to ongoing tasks [3].

While such effects appear to be well-established for stimuli reflecting negative events (such as threats or disgust), evidence is gathering that such effects are also present for positively valenced stimuli. The depiction of erotic/sexually related stimuli might be hypothesized to be of motivational importance and show similar effects to those demonstrated for negative stimuli. In turn, such techniques might then be used to examine individual differences in the processing of sexual stimuli [4–6] including the possible use in the detection of sexual deviancy [7–9]. As there is widespread agreement that men are more sexually motivated than women [10] (though see Dawson and Chivers [11] for a more nuanced approach) and more interested in sexual images [12], it seems obvious that such effects of sexual images should be greater in men than in women.

1.1. Sexual Content Induced Delay (SCID)

Across a range of studies and paradigms, there is strong evidence that sexual stimuli produce a "sexual content induced delay" (SCID). For instance, Geer and Bellard [13] had participants decide if letter strings were real words or not (a lexical decision task). They found that sexual words took longer to classify than control words (see also [14,15]). The original explanation for these effects was that sexual semantic stimuli require more elaborate processing than neutral semantic stimuli [16]. Thus, the original SCID effect appears to be referring to the processing of the sexual words themselves.

Since these early studies, others have shown SCID-like effects are not confined to semantic stimuli and can also occur when processing neutral targets in the context of sexual

stimuli which are irrelevant to the task. In a rapid serial presentation task (RSVP), it was found that images with a sexual content interfere with the subsequent processing of a target stimulus (the "emotional blink") and that these sexual stimuli produce a greater emotional blink than other emotional stimuli [17]. Imhoff et al. [18] used a modified version of the Posner cueing paradigm but used cues that were either sexual or neutral in content. Whilst they were unable to show any effects of the sexual content on the spatial allocation of attention, they were able to show that sexual content slowed performance no matter what the spatial relationship of the target and cue's locations.

In this paper, we consider one task that has been extensively used to examine the processing of emotional stimuli that is often referred to as the "parallel decision task", "choice reaction time task", or the "emotional distraction task" (we will use the latter in this report). The basic elements of the task (and the task used in the present experiments) are illustrated in Figure 1. The participant is asked to perform a task (preferentially a simple perceptual task, see Carretié [19]), in this case to compare the orientation of the two target lines, and to ignore the image (the "distractor"). The task examines processes that are "automatic" in the sense that the participant should try not to process this distractor image (and this is clearly stated) in that it gives no indication of the location of the targets and that it gives no indication of the response to be made. Note it differs from tasks such as the RSVP task, where the participant must process the distractor images to determine they are not the target.

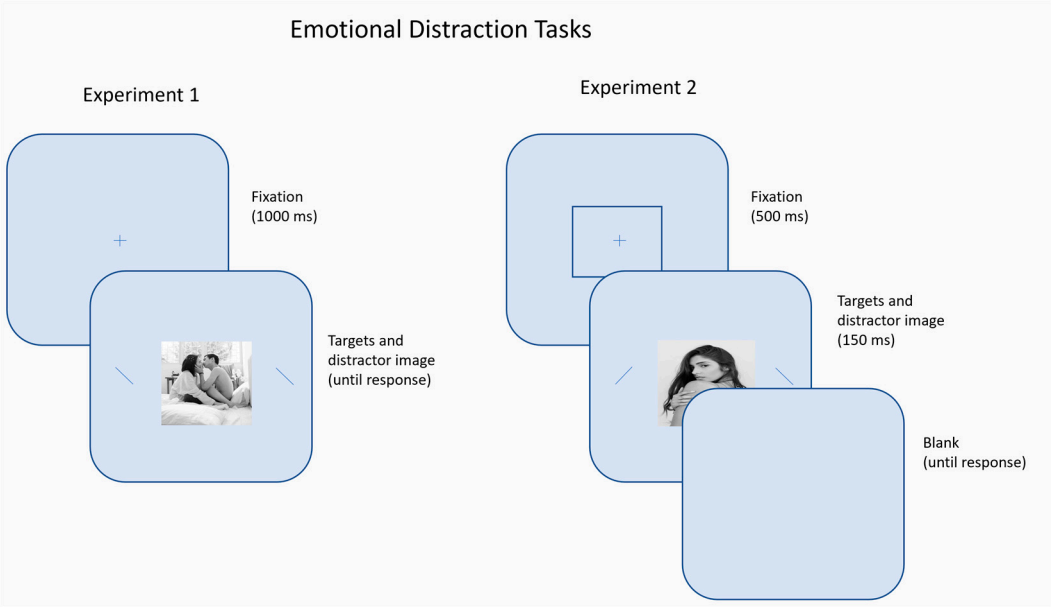

Figure 1. Illustration of the tasks in Experiment 1 and Experiment 2.

Codispoti et al. [20] used an emotional distraction task and showed that erotic distractors slowed the processing of the target stimulus. The results are thought to reflect that erotic stimuli automatically attract attention leaving less resources to process the lines, and hence the slower reaction times (also [21,22]), though an explanation in terms of both neutral and erotic stimuli both initially attracting attention but that it may be harder to disengage attention from the erotic stimulus would also explain these results.

This task, and its variants, were the subject of a meta-analytic review. Strahler et al. [23] found that emotional distraction tasks (in their review Strahler et al. [23] refer to these as "parallel decision tasks"), in comparison to other paradigms such as the "dot-probe task", produced the greatest overall effect for erotic stimuli (g = 0.66, 95%CI [0.41, 0.92]). However, this review also found evidence of possible publication bias which might serve to exaggerate this estimate.

1.2. Gender Differences and the Mechanisms of the SCID

Gender differences in sexuality are an important topic for investigation. The general view is that women have a lower sexual drive than men [24,25], and this might then be reflected in the results found in cognitive tasks such as the emotional distraction task. However, there has been some argument as to the direction that this might take depending upon the mechanism of the SCID.

It has been suggested that the SCID results might arise due to the shocking nature of such words or images in the same manner it has been shown that "taboo" words also are slower to be named in a lexical decision task [26,27]. As women are less exposed to sexual material [28,29], this predicts that the sexual images will cause a greater SCID in women. Geer and Bellard [13] suggest that the SCID might arise due to a response bias to be careful and not make mistakes when confronted with sexual material. They further suggest that this bias may be stronger in women (though it is not clear why this may be so), so this theory also predicts a greater SCID in women than men.

Finally, some (e.g., Imhoff et al. [18]) have proposed that the SCID occurs due to the attention-grabbing properties of the sexual stimulus and that the more "motivational" the person finds the image then the greater the SCID should be. If we can assume that men are more sexually motivated than women (see above), this predicts that the SCID effect would be greater in men than women.

These theories make contradictory predictions as to the size of the SCID effect in men and women—unfortunately, the empirical data are equally contradictory. Geer and Bellard [13] found that the SCID was greater for women than for men using the lexical decision task and this was later replicated [14]. In her replication and extension of this work, Conaglen [15] showed a similar greater effect for women, but only for those who reported high levels of sexual desire. For people with an "average" level of sexual desire, Conaglen did not find any gender differences in the SCID effect. This lack of gender difference has also been reported by Kagerer et al. [21] and Strahler et al. [22] using the emotional distractor task (see also Imhoff et al. [18]). When Conaglen examined people with low sexual desire there appeared to be a greater effect for men than women.

We could find no report of a greater SCID for men in studies that used an emotional distractor task (and sex vs. neutral pictures—see below). However, a recent study [30] used a go-nogo task (where the person must respond quickly to most of the target stimuli but withhold their response for other stimuli) where the target stimulus were superimposed on an "irrelevant" image. This paradigm also produced a SCID-like result where greater commission errors (responding to the target when the correct behavior was to not respond) occurred when the targets were superimposed on sexual images as compared to neutral images. Crucially, this SCID-like effect was greater for men than women.

Thus, this review suggests that the "obvious" greater effect of sexual images on men than women postulated at the start of this article has little evidence to support it when the "automatic" component of visual attention to the image is measured using the emotional distractor task.

1.3. Male vs. Female Images

Perhaps more interesting than possible quantitative differences in sexual interest between genders is the possibility of qualitative differences. In particular, it has been proposed that heterosexual men show a strong response, including both cognitive and genital responses, to images of women but not to images of men [31–33]—for a review see Chivers [34]. However, the responses, again including both cognitive and genital reactions, of heterosexual women are not category specific with women showing roughly equal responses to images of both men and women [31,35].

Most studies using the emotional distraction task to examine gender differences reviewed above have used erotic images that depicted both men and women (couples), and/or only the gender that the participant stated they sexually preferred. Hence, a clear

distinction of their responses to their preferred and to their non-preferred gender is not possible from these studies.

There appears to be one exception to this. Wright and Adams [36,37] performed two experiments that specifically addressed distraction from both preferred and non-preferred gender images in both men and women (including both hetero- and homosexual men and women). In their version of the emotional distraction task (Wright and Adams refer to this as a "choice reaction time" task), the participant had to report on the location of a target dot that was superimposed onto the image itself. Wright and Adams [36,37] claim that "reaction times were longest with nude stimuli of the preferred gender for each group" (p. 145) with similar results but weaker when images of clothed people were used. However, this statement does not provide a complete picture of the results. While heterosexual men were slower to targets for their preferred gender (female) nude images (estimated $d \approx 1.4$), the effect for heterosexual women was far smaller (estimated $d \approx 0.2$) and not statistically different from zero. For the clothed images, women were faster (but not significantly so) to targets for their preferred image. Hence, these data are more in-line with the idea that heterosexual men show a category specific bias to their preferred gender, while those of heterosexual women show little sign of category specificity to their preferred gender. It should also be noted that Rönspies et al. [5] were not able to find any differences in the distraction effect caused by male and female images between heterosexual and gay men (though see Santtila et al. [6] for evidence for such as difference).

Other cognitive/behavioural measures have been used to examine this issue. Dawson et al. [38] examined the pattern of eye-movements when two images, one of a male nude and the other of a female nude, were presented. They found that the initial movement of the eyes was towards the female images for heterosexual men, but that heterosexual women were equally likely to move their eye to either image. Similar results were reported [39,40] using a dot–probe task where movements of attention, rather than explicit eye-movement, were examined. However, when overall time spent looking at each image was examined both men and women viewed their preferred-sex images for a longer period. These results were interpreted as suggesting that the early and automatic processing of these images was category-specific for men but not for women, while later controlled processes were category-specific for both genders. Viewing times have also been extensively used to examine sexual interest. The results comparing viewing times to male and female images has produced a more variable set of results. This may be because this method likely involves both automatic processes and controlled processes. Nevertheless, Lalumière et al. [41] concluded after reviewing the available evidence that women's responses were far less categorical than those of men. Hence, these other cognitive/behavioural measures also point to category-specific responses in men but not in women, especially when early automatic processes are examined.

Reactions to sexually preferred vs. non-preferred gender images have also been investigated using psychophysiological measures. The pupil typically dilates to arousing images [42,43]. This has been used as a measure of sexual interest to images of men and women [44]. A meta-analysis [45] of studies that have compared the response of the pupil to image of men and women concluded that the evidence shows that heterosexual men show greater pupil dilation to female stimuli, while gay men show greater responses to male stimuli. Overall, the pupil responses of heterosexual women were approximately equal to male and female stimuli. Finke et al. [46] examined both skin conductance responses and changes in heart rate to male and female images that were presented for 2500 ms. Men showed greater responses to female images than male images for both indices while the response of women were similar to both sets of images. Sarlo and Buodo [47] examined changes in blood pressure to videos (32 s) of male–female, male–male, and female–female sexual activity. Men showed the largest response to female–female videos, while the responses of women were not significantly different between any of the video categories (though the trend appears to be a greater response to female–female videos). Safron et al. [48] used fMRI to examine the responses in the ventral striatum, an area known

to response to the erotic content of an image [49], to images of nude men and women. Heterosexual men showed far greater ventral striatum responses to nude women than nude men, while heterosexual women did not show any significant difference in their response to these two categories of image. This brief review of these other psychophysiological measures appears to support the notion of category-specific responses to female images in heterosexual men, but non-category-specific responses in heterosexual women.

1.4. Aims and Hypothesis of the Present Studies

The first aim of the study was to confirm that sexual images produce a delay in processing an accompanying target stimulus (Hypothesis 1). This was tested by comparing reaction times when images of couples involved in sexual activity are distractors in comparison to neutral (non-sexual) distractors. Given that the emotional distraction task hopes to assess sexual interest, we were struck by the lack of any evidence for greater distraction due to sexual images in men in comparison to women. The second aim of the study was to examine this issue by comparing the amount of distraction produced by sexual images (of couples) in men and women. We hypothesized that this would be greater in men (Hypothesis 2). The third aim was to examine the amount of distraction caused by images of the person's self-reported preferred sex. Following the findings of Wright and Adams [36], we predicted that men (or at least gynephilic (heterosexual) men) would should a greater distraction effect for female images than male images (Hypothesis 3). Given the findings that androphilic (heterosexual) women appear to show little category-specific responses in early attentional processes (see [38–40]), we expected to find distraction effects for both male and female distractor images with this distraction effect being of equal magnitude (Hypothesis 4).

Finally, we aimed to report on the reliability of these effects. Effects based on tasks where the manipulated stimuli are irrelevant to the response, especially where these involved a difference between two reaction times, often have poor reliability as indexed by the consistency of individual differences [50–52]. However, few studies using the emotional distraction task in the field of sexual interest have reported on this. Gress et al. [7] report high reliability in their study of sexual offenders (and controls), but further inspection shows that these reliability calculations were based on simple RTs to each of the stimuli (e.g., neutral images, male images, female images) rather than the difference between the conditions. Hence, this index of reliability only shows that people's overall speed of processing is quite reliable, not the index of sexual attraction (unfortunately, this issue also applies to their main analysis comparing the groups - they show group differences in the overall speed of responding but do not report on the magnitude of the distraction effect for these stimuli). The only previous study to present the reliability of the distraction effect is that of Rönspies et al. [5], where the reliability index was poor ($\alpha = 0.23$).

2. Experiment 1

2.1. Methods

Participants

In total, 43 (22 women and 21 men) young adult participants (mean age = 21.5, SD = 2.9, range 18–31) were recruited via advertisement around the School of Psychology, Cardiff University. They were given payment (GBP 10) for their completion of the tasks reported here and some pilot work involving other tasks not reported here.

Each participant was given a preliminary information sheet and a sheet that displayed all the images being used in the tasks. Informed consent was then obtained, with the right to withdraw from the study at any time. Ethical approval was obtained for all parts of the study from the Ethics Committee of the School of Psychology, Cardiff University. The data that support the findings of this study are openly available in Mendeley Data, V1, doi: 10.17632/xkbp2y6dg2.1.

2.2. Materials

Emotional Distraction Task. Stimuli were chosen from established image databases: the International Affective Picture System (IAPS; [53]) and the Nencki Affective Picture System (NAPS—erotic; [54]) (see Appendix A for details of the images). Of these, 10 were of heterosexual couples engaged in sexual activity, 10 were of women nude or partially dressed but not sexually active, 10 were of men nude or partially dressed but not sexually active or aroused, 10 contained people (neutral faces, people working or shopping, etc.), and 10 were of objects (clocks, boats, garden, etc.). These images were rated for sexual attractiveness in a separate, but similar demographic, sample (N = 19: 8 men, 11 women: mean age = 18–30 years) to those who completed the main experiment. For these ratings, each image was presented briefly (500 ms) and the participant was then prompted to answer the question "How sexually attractive did you find this image?" on a scale of 1 to 7 (where 1 was anchored with "not at all" and 7 with "extremely attractive". Each image was presented twice with the order of the images randomized. The rating of the erotic couples images did not differ significantly between men and women (3.94 vs. 3.74; $t(17) = 0.58$, $p = 0.29$, $g = 0.13$). The female images were rated more highly by men than women (4.95 vs. 2.98; $t(17) = 2.71$, $p = 0.007$, $g = 1.21$), whilst the male images were rating more highly by women than men (2.88 vs. 1.14; $t(17) = 4.21$, $p < 0.001$, $g = 1.87$). Nearly all participants gave a rating of "1" for all the people and object images. Hence, the erotic couples stimuli had similar rating of sexual attractiveness for men and women.

The images were all converted to grayscale to avoid colour being a major cue (as the sexual images all contained more flesh tones than the neutral images) and were adjusted for brightness and contrast to the same overall value for each image.

A typical trial is depicted in Figure 1. Each trial commenced with a blank screen for 1000 ms, followed by the distractor image (15 cm by 11 cm, or 15 deg by 11 deg as the viewing distance was 57 cm) and the targets. The targets appeared 12.5 cm either side of the fixation point and were 2 cm long (0.5 mm wide). The distractor and targets remained on the screen until the participant responded. Participants were required to press the "A" key on the keyboard if the lines were of the same orientation and the "L" key if they were of different orientations.

In the main block of trials, each distractor was presented three times with the choice of targets being randomly chosen for each trial. There were 150 trials in total. Prior to this main block of trials, the participants completed a practice set of 20 trials that used "neutral" images from the IAPs that were not used in the main trail block. For these trials, participants were given feedback relating to whether their response was correct and their reaction time. The experiment was controlled via the Psychopy software.

Kinsey Scale. Sexual attraction was evaluated by a Kinsey scale [55] with seven options. Option 0 was labelled as "Exclusively attracted to the other gender", option 3 was labelled as "Equally attracted to both genders", and option 6 was labelled as "Exclusively attracted to the same gender". The seventh option was an "*X*" and was labelled "non-sexual or other".

2.3. Procedure

Participants received an information sheet providing a brief description of the study, this forewarned participants that they would be exposed to sexual stimuli. Preliminary consent was then obtained for them to a preview of all the stimuli to be used. This was achieved via a single sheet with all the images in "thumbnail" form. If participants were happy to proceed, they signed the consent form and then completed a demographic questionnaire. It was explained that their data would be held anonymously, and participants were asked if they had any questions before starting the study.

Participants sat in front of the computer screen with their eyes approximately 57 cm from the screen. An instruction slide explained the nature of the task and that they should ignore the distractor images at the centre of the screen. They completed the emotional

distraction task and then the Kinsey scale. Participants were thanked for their time, received a debrief sheet about the purpose of the study, and credits or payment were awarded.

2.4. Data Analysis

For the emotional distraction task, a mean RT was calculated for trials on which the targets were correctly classified in the range of 250–1500 ms. Error rates were also recorded. Mean reaction times and percentage of errors were calculated and inspected for outliers. No participants were removed due to excessive errors (>25%). The RT data were then inspected for outliers (>3 SD from mean), but none were found. The final data set consisted of 43 participants (21 male, 22 female). The analysis below is on this sample, however, the analyses were also repeated after the removal of five participants (two male, three female) who reported Kinsey scores of 2 or greater. The same pattern of results and significance was found and so only the former analysis is presented.

The reaction times were inspected for normality of distribution and were deemed to be close to a normal distribution with all conditions showing low levels of skew (<1.0). Kolmogorov-Smirnov tests did not indicate deviation from a normal distribution (all ps > 0.20). The error data showed a skewed distribution so the data were transformed by the function $\sqrt{(1 + X)}$ for statistical analysis.

2.5. Results

Figure 2A illustrates the RTs in each condition for each gender. A two-way mixed ANOVA with a within-participants factor of distractor image (neutral—people, neutral—not people, female, male, couple) and a between participants factor of gender (men, women) was conducted. Mauchly's test indicated that the assumption of sphericity was not violated ($\chi^2(9) = 15.94$, $p = 0.07$). There was a main effect of gender, $F(1, 41) = 8.30$, $p = 0.006$, $\eta_p{}^2 = 0.17$, with men showing slower RTs than women. There was a main effect of distractor image type, $F(4, 164) = 16.00$, $p < 0.001$, $\eta_p{}^2 = 0.28$. The interaction term between gender and distractor type was not significant, $F(4, 164) = 2.29$, $p = 0.06$, $\eta_p{}^2 = 0.05$.

The main effect of distractor type was further examined. First, the two neutral distractors were compared and no significant difference was found, $t(42) = 0.85$, $p = 0.40$, so data from these two conditions were combined. We next calculated sex-distraction effects by subtracting RTs from the combined neutral condition from each of the other distractor types. These are illustrated in Figure 2B.

Hypothesis 1 (that erotic couple stimuli would produce a distraction effect (or SCID)) was tested by a one-sample t-test. This effect was significant with a large effect size, 39.4 ms $t(42) = 6.24$, $p < 0.001$, $d = 0.95$, 95%CI [0.59, 1.31]. Similar tests showed that both the female and male distractors also produced significant distraction (female: 24.1 ms, $t(43) = 4.17$, $p < 0.001$, $d = 0.64$, 95%CI [0.30, 0.96]; male: 22.2 ms, $t(43) = 3.98$, $p < 0.001$, $d = 0.61$, 95%CI [0.28, 0.93]) showing that any sexual content showed significant slowing of RTs.

Our main hypothesis (Hypothesis 2), of gender differences in the magnitude of SCID, was explored by comparing the magnitude of the distraction effects between men and women (see Figure 2B,C). The distraction effect for the erotic couples stimuli was greater for men than for women (53.3 vs. 26.1 ms; Δ27.2 ms, $t(41) = 2.25$, $p = 0.02$, $g = 0.67$, 95%CI [0.07, 1.28]). Interestingly, the magnitude of the effect when expressed in terms of effect size (Cohen's d) was similar for both genders (men = 1.03, 95% CI [0.49, 1.56], women = 1.14 95% CI [0.59, 1.67]. Inspection of Figure 2C shows that this arose as the increased magnitude of the overall SCID effect in men was accompanied by an increase in the variance. Such a result is commensurate with the distribution being "stretched out" towards greater effects in men compared to women. Such a stretching effect serves to increase the mean effect with a linear increase in the standard deviation [56]. Thus, while the mean increases, the effect size is not altered by this change.

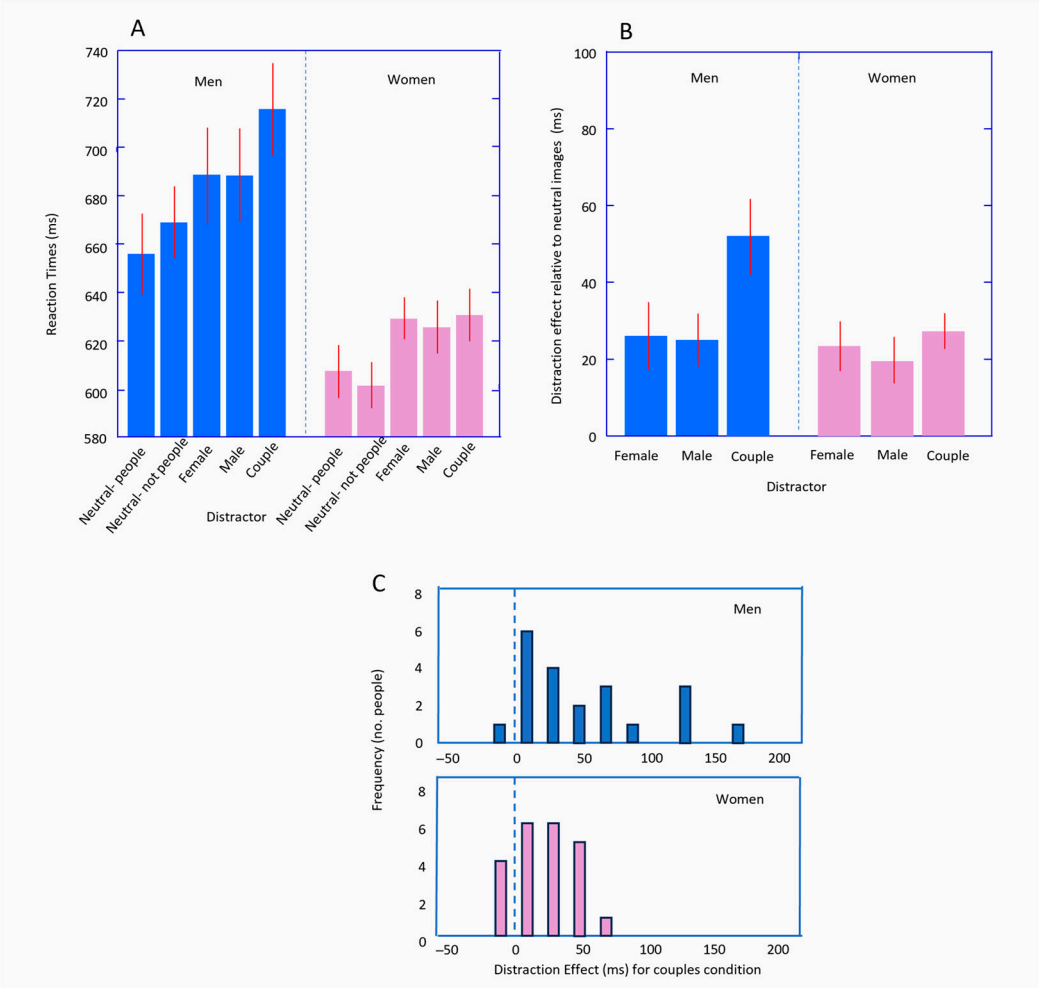

Figure 2. Results from Experiment 1. The left panel (**A**) shows the RTs for each condition. The right panel (**B**) shows the distraction effect. Error bars represent ±1 standard error of the mean. (**C**) Frequency histograms of the distraction effect (SCID) as a function of gender.

Hypothesis 3 (that men would show greater distraction for female than male distractors) was tested by comparing the distraction effects caused by the male and female distractors in men. These did not differ significantly (25.3 vs. 24.3 ms, Δ0.9 ms, $t(20) = 0.10$, $p = 0.92$, $g = 0.02$, 95% CI [−0.41, 0.45]). Hypothesis 4 (that women would show equal distraction for female than male distractors) was similarly tested. No significant difference in the amount of distraction was found (22.9 vs. 20.2 ms, Δ2.7 ms, $t(21) = 0.37$, $p = 0.71$, $g = 0.08$, 95% CI [−0.34, 0.50]).

To calculate the reliability of the sex distraction effects separate indices were calculated for the odd number and even numbered trials (split-half reliability). The resulting correlations were then corrected by the Spearman-Brown prophecy formula for loss of trials. Table 1 shows that all the indices of reliability were poor.

Table 1. Reliability indices from both experiments.

	Experiment 1			Experiment 2	
	Couple	**Male**	**Female**	**Male**	**Female**
Distractor					
All	0.36	0.11	−0.05	0.27	0.49
Men	0.64	0.26	−0.33	0.40	0.57
Women	−0.29	0.07	0.28	0.07	0.27

For the error data, a two-way mixed ANOVA showed no main effect of gender, $F(1, 41) = 0.46$, $p = 0.50$, $\eta_p^2 = 0.01$, no main effect of image type, $F(3, 123) = 0.71$, $p = 0.55$, $\eta_p^2 = 0.02$, nor any interaction, $F(3, 123) = 1.15$, $p = 0.33$, $\eta_p^2 = 0.03$.

2.6. Summary and Discussion

The experiment shows the expected and well-established finding that sexual stimuli produce an interference effect in processing other stimuli (or SCID) which confirmed Hypothesis 1. In this case, the effect size was "large" (Cohen's $d \approx 1$) for the erotic couples stimuli, and of medium size for the male and female distractors (Cohen's $d \approx 0.6$). However, despite the large effects found, the reliability of the task as indexed via individual differences was poor. Importantly, this SCID effect when using image of erotic couples was greater in men than it was in women, supporting our second hypothesis. We shall return to this point in the general discussion.

Our third hypothesis was that men would produce a greater SCID when viewing images of females than those of males. This was not supported—both male and female images produced SCIDs of approximately equal magnitudes. Our fourth hypothesis was that women would have SCIDs to both male and female images and that they would be of approximately equal magnitudes. The data support this. However, we had hoped that we could contrast this lack of a category specific interference effect (a "null" finding) in women against the expected category specific effect in men to demonstrate a gender difference. Given that men did not show this expected effect, we were not able to demonstrate such gender differences.

3. Experiment 2

Before concluding that the emotional distraction task does not reveal any category specific responses in men or women, we attempted to repeat this part of the study with some improvements to the methodology. First, others have shown that the effects of sexual stimuli on the emotional distraction task are subject to habituation effects such that the effect decreases as the task progresses [6,20]. To try and counter such an effect, we decided to: (1) decrease the number of trials overall and (2) decrease the proportion of sexual to neutral stimuli presented so that sexual stimuli would be presented less frequently. In Experiment 1, "sexual" stimuli trials (90) were more prevalent than neutral stimuli trials (60). As the aim of Experiment 2 was only to compare male and female images, only these two categories of sexual image were used. We also increased the number of neutral stimuli used. The task in Experiment 2 contained 80 trials with neutral content and 40 trials with sexual content. Hence, sexual stimuli were now present in only 1 of every 3 trials (on average). It is important to note that the frequency of male and female distractors (the critical comparison) was the same. We further note that others [57] have shown that emotional distractors that are presented rarely are more potent that those that are presented frequently.

In Experiment 1, the distraction and target stimuli were presented until the person made a response. It is possible that participants might make an eye movement towards one of the two target stimuli. In order to eliminate possible eye movements, the stimuli in Experiment 2 were presented briefly (150 ms), which is below the time for the initiation of saccades [58] and has been successfully used in previous studies of the sexual distraction effect [20].

Finally, the sample size in Experiment 1 was relatively small. To provide a more sensitive test of the hypotheses the sample was increased. We powered the study to be able to detect a difference in the magnitude of distraction effects between men and women with a medium effect size ($d = 0.50$) and standard alpha (0.05, one-tailed) and power (0.80). This required 50 people per gender group. We only included participants who reported their sexual interests are heterosexual or mainly heterosexual (Kinsey score of 0 or 1).

3.1. Methods

Most of the methods were similar to Experiment 1 and so this section only highlights the differences. In total, 131 (58 women and 71 men, 2 gender data missing) young adult participants (mean age = 21.5 years, SD = 2.7, range 18–25) commenced the study. All women and most men were recruited through the Cardiff University School of Psychology via the Experimental Management System (EMS) and were given course credit for their participation. However, due to an insufficient number of male volunteers, further men were recruited by word of mouth among other University students. These participants were given a cash reward. Ethical approval was obtained for all parts of the study from the Ethics Committee of the School of Psychology, Cardiff University. The data that support the findings of this study are openly available in Mendeley Data, V1, doi: 10.17632/xkbp2y6dg2.1.

All images were selected from the IAPS and consisted of five images of males, five of females, and 20 neutral images (see Appendix A). As in Experiment 1, the sexual images were of naked and partially dressed individuals but not engaged in sexual activity or aroused. The male and female images were matched in terms of the pose of the individuals.

Each trial (see Figure 1) consisted of a fixation slide for 500 ms before the target stimuli (two lines) and distractor (image) appeared simultaneously for 150 ms. The fixation slide comprised of a rectangular box (the same size as the upcoming image) with a fixation point at the center. Overall, there were 120 test trials (80 neutral distractors, 20 male distractors, 20 female distractors) with each distractor appearing on four trials (once with each of all the four possible target configurations). These trials were presented in a random order, which was different for each participant. Before this main block of trials, participants completed 12 practice trials using neutral images that were not used in the main block of trials. The task was run through DirectRT(v2012).

Data were processed as for Experiment 1. Data for five participants were excluded due to missing data or corrupted files, and 12 participants were removed due to excessive errors (>25%). Data for seven participants were removed due to Kinsey ratings greater than one. The final data set consisted of 107 participants (61 male, 46 female) for analysis. The reaction times were inspected for normality of distribution and were deemed to be close to a normal distribution with all conditions showing low levels of skew (<1.0). Kolmogorov–Smirnov tests did not indicate deviation from a normal distribution (all *p*s > 0.20). The error data showed a skewed distribution so the data were transformed by the function $\sqrt{(1 + X)}$ for statistical analysis.

3.2. Results

Figure 3A illustrates the results. A two-way mixed ANOVA on the RT data with a within-participants factor of distractor image (neutral, female, male) and between-participants factor of gender (men, women) was conducted. Mauchly's test indicated that the assumption of sphericity was not violated ($\chi^2(2) = 2.89$, $p = 0.24$). There was no main effect of gender, $F(1, 105) = 0.48$, $p = 0.49$, $\eta_p{}^2 = 0.01$. There was a main effect of image type, $F(2, 210) = 26.30$, $p < 0.001$, $\eta_p{}^2 = 0.20$, which was moderated by an interaction with gender, $F(2, 210) = 5.72$, $p = 0.004$, $\eta_p{}^2 = 0.05$. The interaction was investigated by calculating the distraction effect (the difference in RTs in comparison to the neutral trials) for the male and female images separately and examined for each gender in turn (see Figure 3B).

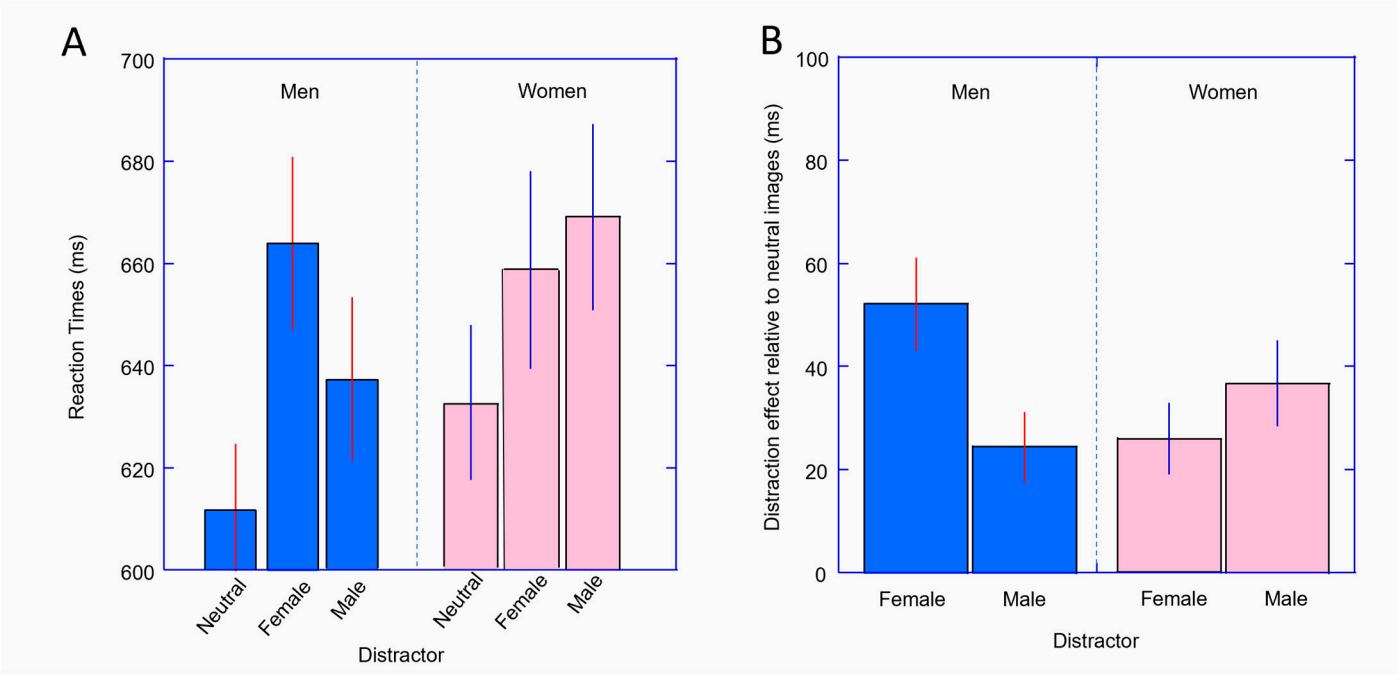

Figure 3. Results from Experiment 2. The left panel (**A**) shows the RTs for each condition. The right panel (**B**) shows the distraction effect. Error bars represent ±1 standard error of the mean.

For men, the distraction effect for the female images was significant (Δ52.1 ms, $t(60) = 5.91$; $p < 0.001$; $d = 0.76$, 95% CI [0.47, 1.04]), as was that for male distractors (Δ25.3 ms, $t(60) = 3.81$; $p < 0.001$; $d = 0.49$, 95% CI [0.22, 0.75]). The distraction effect for the female images was significantly larger than for the male images (Δ26.8 ms, $t(60) = 3.79$; $p < 0.001$, $d = 0.49$, 95% CI [0.22, 0.75]).

For women, the distraction effect for both the female images (Δ25.9 ms, $t(45) = 3.88$; $p < 0.001$; $d = 0.57$, 95% CI [0.26, 0.88]) and male images (Δ36.6 ms, $t(45) = 4.52$; $p < 0.001$; $d = 0.67$, 95% CI [0.34, 0.98]) was significant. However, the distraction effect did not differ for the male and female images (Δ10.6 ms, $t(45) = 16$; $p = 0.30$, $d = 0.16$, 95% CI [−0.14, 0.45]).

Reliability of the emotional distraction task was calculated via the distraction effects produced when the data were split into "odd and even" trials. The resulting correlation was then corrected for the loss of trials due to splitting by the Spearman Brown prophecy. The reliability of all the indices was poor (see Table 1).

For the error data, a two-way mixed ANOVA showed no main effect of gender, $F(1, 105) = 2.24$, $p = 0.07$, $\eta_p^2 = 0.03$, no main effect of image type, $F(2, 210) = 1.42$, $p = 0.24$, $\eta_p^2 = 0.01$, nor any interaction, $F(2, 210) = 0.25$, $p = 0.78$ $\eta_p^2 = 0.002$.

3.3. Summary and Discussion

As expected, both male and female distractors produced a distraction effect (medium to large effect sizes) confirming the SCID effect. However, this effect was clearly larger to female distractors than to male distractors in men but equal in women. Hence, Hypotheses 3 and 4 were confirmed. Despite these strong group effects and differences, the reliability of the indices was poor.

4. General Discussion

Across the two studies, we were able to show consistent distraction effects due to sexual stimuli in both men and women. These findings simply add to the large body of data indicating that sexual stimuli are processed differently from non-sexual stimuli.

4.1. Sexual Content Induced Delay

A plethora of studies have shown that men are more sexually motivated than women [10,24] and more interested in sexual material [28]. It has been argued that sexual content is used to promote and advertise product, with men as the major target [59,60]. As such, we might expect to see greater effects of sexual stimuli in men. Experiment 1 provides, to our knowledge, the first clear evidence for this effect (though see Wiemer et al. [30] for a similar result using a go–no-go task). It is of interest to speculate as to why previous studies have failed to demonstrate this result. Geer and Bellard [13] showed a clear gender effect but in the opposite direction. Their study involved the processing of letter strings to decide if they were real words. Hence, this task differs in several ways from the present result. First, there is a clear difference in the nature of the stimuli—words vs. pictures. Houwer and Hermans [61] show that pictures are classified in terms of affect in less time than pictures, and that pictures interfere with words whereas words do not interfere with pictures. They suggest, therefore, that pictures have "privileged access to affective information" (p. 9). Pictures, in comparison to words, also appear to give greater responses in parts of the brain thought to underpin affective processing [62], and sometimes, only pictures and not words can produce these effects [63]. Second, in the task of Geer and Bellard, the person had to specifically process the sexual "word" to decide if it was a word or not, whereas in the present study, the person was motivated to avoid processing the sexual stimulus. In other words, the distractor was "task-relevant" for Geer and Bellard, but "task-irrelevant" in the present study. Thus, there is a clear difference in attention to the distractor between the two conditions. The role of attention to the distractor stimulus has rarely been explored [64], and in this study, we wished to isolate the "automatic" distraction effect of sexual images when the person was not paying any deliberate attention to the distractor. Clearly, there is much for future studies to examine before the role of gender on the SCID is fully understood.

The postulated difference in the magnitude of the SCID effect between genders was based on the premise that men are more sexually motivated than women. Hence, it would be expected that the SCID effect would be positively associated with measures of sexual motivation. Unfortunately, such measures were not taken in the present study. However, several such measures were taken in the studies of Imhoff et al. [18]. While the results across the measures were generally non-significant, there appeared to be a reliable effect of the Sexual Excitation Scale (SES; [65]), whereby greater SES scores was related to greater SCID effects (and men show greater scores than women on this scale [66]). We note that this same scale was not related to the SCID effect in the study of Carvalho et al. [67]. The study of Kagerer et al. [21] also included measures of sexual interest/desire/motivation. Again, the results were mainly non-significant, but there was a positive correlation between the magnitude of the SCID effect and scores on the Sexual Sensation Seeking Scale [68], which was significant for women. However, Kagerer et al. did not find any significant gender differences in the magnitude of SCID. We recommend that such measures be taken in future studies to see if any effects of gender on attention/distraction from sexual images is underpinned by differences in sexual motivation.

4.2. Female vs. Male Images

The third aim was to examine if the SCID effect elicited by male and female sexual images in men and women would reflect earlier findings using different tasks that gynephilic men would show category specific distraction (i.e., greater distraction from female than male images) while androphilic women would show a non-category specific distraction to both male and female images. The studies produced somewhat contradictory results. No such evidence was found in Experiment 1, whereas evidence for these hypotheses was shown in Experiment 2. The reason for the difference in results between the two studies is unclear but may well relate to the "improvements" we introduced for Experiment 2. In particular, we reduced the frequency of sexual distractors in the study in the hope to minimize habituation effects which might serve to reduce or eliminate distraction effects [20]. Further, it has been shown that rare distractors produce greater distraction effects than

frequent distractors [57,69], which may lead to a more sensitive test of the hypotheses. We recommend that future studies carefully consider these factors when designing such tasks.

Another possibility for the different results between Experiments 1 and 2 is the difference in the duration of the distractor image. Reducing the duration of the distractor image in Experiment 2 may have allowed an easier disengagement from the distractor image in relationship to Experiment 1 allowed for individual differences to emerge. The role of distractor image duration in such an experiment does not appear to have been systematically explored, and therefore, it is unknown if this difference has important consequences for the pattern of results produced.

The results add to the burgeoning literature showing differences in the category-specificity of men and heterosexual women's sexual responses [31–35,38–40,70] and extend these findings to a task in which the sexual image is task-irrelevant, suggesting that these categorical (or not) responses occur automatically. However, we note recent evidence that this lack of category-specificity is not absolute and there are influences related to the attractiveness of the image [71]. Again, future studies of distraction effects (including SCID) need to consider such issues in their design.

4.3. Nature of the Sexual Stimuli

The present studies chose to use images that were of a sexual and/or alluring nature but did not depict more explicit sexual features such as aroused genitals. Alluring images (as opposed to more frankly sexual images) have been used in most of the previous research examining cognitive processes of images [5,7,17,18,20,21,32,33,35–37,39,40,70] and therefore have a strong pedigree as being able to examine gender differences in the processing of sexual content. However, it is possible that the gender differences reported in the present study may be altered by increasing the explicitness of the images. Spape et al. [72] examined genital responses to image that could either show non-prepotent sexual images (e.g., images of a flaccid penis, images of a pubic triangle) or prepotent sexual stimuli (e.g., images of an erect penis, images of an engorged vulva). They found that responses to the non-prepotent images showed category specificity for heterosexual men, but were not category specific for heterosexual women, replicated previous reports [31]. However, both the women and the men showed category specific responses for the prepotent stimuli. This study used trials that were "long" (90 s consisting of the presentation of 15 images for 6 s each) and would clearly involve controlled processes. It would therefore be of interest to see if such prepotent images would also produce a category-specific response in paradigms that aim to examine early automatic processes such as that of the present studies.

A second issue is whether the stimuli used in the present study (and the many others noted earlier) have the same hedonic value for both men and women. For example, if men found the erotic images more attractive than women did, this might account for the greater distraction effect of these images for men. We examined this by getting ratings of the sexual attractiveness of the images. Men and women did not differ on these explicit reports of the attractiveness of the erotic images. Together these results suggest that the explicit rating of the attractiveness of these (particular) images is similar for men and women, but at some implicit level (in this case the ability of the image to demand processing resources) there are gender differences in the processing of these images.

4.4. Reliability and Clinical Use

While we were able to demonstrate group differences, often with large effect sizes, the sexual emotional distraction measure produced low (and quite inconsistent) levels of reliability. It should be noted that reliability (as calculated by indices such as the split-half reliability) is not an inherent feature of the task itself but relates to both the measurement error and the between subjects' variance. A task that shows strong effects across all participants is likely to have low reliability simply because it produces similar effects across all participants and therefore has little between subjects variance [51]. As a simple illustration of this, of the 43 participants in Experiment 1, 38 were slower to the

couples distractor and only 5 were faster, producing a large effect size (d = 0.95); however, the reliability of this effect was poor (r = 0.36). The poor reliability of such a test can be interpreted as the scores on the test not consistently rank-ordering the participants. Hence, tests with low reliability are poor at measuring individual differences.

One of the reasons for the development of such task as the sexual emotional distraction task is to be able to examine people's sexual preferences, and in particular those that they may be unwilling to explicitly report such as a sexual attraction to children or coercive sex (see [4,6,7,73]). Unfortunately, this is a situation in which poor reliability renders such an endeavour pointless. However, it seems likely that if group or individual differences are sufficiently large, then the sexual emotional distraction effect would be more reliable (as the between group variance is increased).

From this discussion, issues of low reliability pose a problem to the use of the distraction task in both experimental and clinical (individual differences) work. Efforts to fully understand the sources of this low reliability and what might be done to improve the task to reduce this problem are needed. In the meantime, we suggest that researchers in this field always report on the reliability of their measures so that readers understand these limitations (see Parsons et al. [52] for this argument in full).

4.5. Limitations and Future Directions

The major limitation of these experiments is in the poor reliability of the emotional distraction task discussed above. The second limitation is the population tested, which were university students in the UK, and as such tend to be young (18–25), white, and well educated. Clearly, there are likely to be changes in sexuality throughout one's lifetime. One of the advantages of the emotional distractor task is that the task to be performed (in this case the comparison of two lines) is simple and non-verbal, allowing the testing of children or animals on similar tasks (though, of course, there are ethical issues relating to the use of sexual stimuli). It also seems possible that these early automatic processes may be influenced by such factors as culture, education, exposure to sexual stimuli, etc. Another limitation is the strong effect of gender noted in Experiment 1, with men being considerably slower in all conditions compared to women, including the neutral conditions. This gender difference did not occur in Experiment 2. We have no explanation as to why this gender difference arose and suspect that this was a mere random event. Nevertheless, this difference in baseline performance lowers our confidence that the greater distraction effects of the erotic stimuli for men were solely due to the erotic nature of these distractors. For instance, it is possible that the greater distraction effect of the couples stimulus on men might be due to the overall slower responses. However, we confirmed that this greater effect for men when still present and statistically significant when a ratio ($RT_{couples}/RT_{neutral}$) index was used rather than a difference score. Such a ratio score takes account for the overall effects of slower RTs.

Another possible weakness is that we presented a subset of the stimuli in "thumbnail" form as part of the consenting procedure to make sure that participants were aware of the nature of the images to be shown. It is possible that this might have induced individual differences as participants were allowed to view these images for as long as they wished. Future studies might want to consider either omitting this stage (if thought to be ethical) or to use images that were similar but not the actual images used in the main data collection trials.

Finally, while the present data show gender differences in that men showed greater sexual distraction effects, other studies have shown the opposite effect (Geer and Bellard [13]—see discussion above). Further work is needed to replicate these studies and to work out why the two tasks/studies have opposite effects.

5. Conclusions

The study demonstrates greater sexual distraction effects in men than women in a simple perceptual decision task. Furthermore, the distraction effects for men were shown

to be category-specific (with a greater distraction from images of females), whereas those of women appeared to be category-non-specific.

Author Contributions: Conceptualization, all authors.; methodology, all authors; software, R.J.S. and P.M.; validation, all authors; formal analysis, R.J.S.; investigation, P.M.; resources, R.J.S.; data curation, R.J.S.; writing—original draft preparation, R.J.S.; writing—review and editing, all authors; visualization, R.J.S.; supervision, R.J.S.; project administration, R.J.S. All authors have read and agreed to the published version of the manuscript.

Funding: This paper received no external funding.

Institutional Review Board Statement: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Ethics Committee of the School of Psychology, Cardiff University (EC.12.10.09.3209GA5).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data that support the findings of this study are openly available in Mendeley Data, V1, doi: 10.17632/xkbp2y6dg2.1.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Images used in Experiment 1.

Neutral—no people: IAPS 5390, 5731, 7003, 7026, 7035, 7038, 7039, 7041, 7140, 7190.

Neutral—people: IAPS 2036, 12190, 2191, 2210, 2214, 2383, 2393, 2741, 2850, 2870.

Couples: IAPS 4647, 4658, 4659, 4668, 4669, 4680, 4692, 4693, 4695, 4800

Female: IAPS 4002, 4003, 4006, 4007, 4071, 4085, 4085. NAPS Female-002, Female_018, Female_021.

Male: IAPS 4470, 4490, 4505, 4510, 4525, 4542, 4572. NAPS Male_016, Male_022, Male_024

Images used in Experiment 2.

Neutral: IAPS 1121, 1340, 1350, 1410, 1463, 1505, 1601, 1616, 2026, 2036, 2384, 2487, 2575, 2791, 2980, 5410, 5455, 5500, 5520, 5661

Female: IAPS 4141, 4142, 4210, 4232, 4240

Male: IAPS 4460, 4500, 4534, 4550, 4561.

References

1. Ohman, A.; Flykt, A.; Esteves, F. Emotion drives attention: Detecting the snake in the grass. *J. Exp. Psychol.-Gen.* **2001**, *130*, 466–478. [CrossRef] [PubMed]
2. Lipp, O.V.; Derakshan, N. Attentional bias to pictures of fear-relevant animals in a dot probe task. *Emotion* **2005**, *5*, 365–369. [CrossRef] [PubMed]
3. Erthal, F.S.; De Oliveira, L.; Mocaiber, I.; Pereira, M.G.; Machado-Pinheiro, W.; Volchan, E.; Pessoa, L. Load-dependent modulation of affective picture processing. *Cogn. Affect. Behav. Neurosci.* **2005**, *5*, 388–395. [CrossRef]
4. Jordan, K.; Fromberger, P.; Von Herder, J.; Steinkrauss, H.; Nemetschek, R.; Witzel, J.; Müller, J.L. Impaired attentional control in pedophiles in a sexual distractor task. *Front. Psychiatry* **2016**, *7*, 193. [CrossRef]
5. Rönspies, J.; Schmidt, A.F.; Melnikova, A.; Krumova, R.; Zolfagari, A.; Banse, R. Indirect Measurement of Sexual Orientation: Comparison of the Implicit Relational Assessment Procedure, Viewing Time, and Choice Reaction Time Tasks. *Arch. Sex. Behav.* **2015**, *44*, 1483–1492. [CrossRef]
6. Santtila, P.; Mokros, A.; Viljanen, K.; Koivisto, M.; Sandnabba, N.K.; Zappala, A.; Osterheider, M. Assessment of sexual interest using a choice reaction time task and priming: A feasibility study. *Leg. Criminol. Psychol.* **2009**, *14*, 65–82. [CrossRef]
7. Gress, C.L.Z.; Anderson, J.O.; Laws, D.R. Delays in attentional processing when viewing sexual imagery: The development and comparison of two measures. *Leg. Criminol. Psychol.* **2013**, *18*, 66–82. [CrossRef]
8. Snowden, R.J.; Craig, R.L.; Gray, N.S. Indirect Behavioral Measures of Cognition among Sexual Offenders. *J. Sex Res.* **2011**, *48*, 192–217. [CrossRef]
9. Mokros, A.; Dombert, B.; Osterheider, M.; Zappala, A.; Santtila, P. Assessment of pedophilic sexual interest with an attentional choice reaction time task. *Arch. Sex. Behav.* **2010**, *39*, 1081–1090. [CrossRef]

10. Baumeister, R.F.; Catanese, K.R.; Vohs, K.D. Is there a gender difference in strength of sex drive? Theoretical views, conceptual distinctions, and a review of relevant evidence. *Personal. Soc. Psychol. Rev.* **2001**, *5*, 242–273. [CrossRef]
11. Dawson, S.J.; Chivers, M.L. Gender differences and similarities in sexual desire. *Curr. Sex. Health Rep.* **2014**, *6*, 211–219. [CrossRef]
12. Rupp, H.A.; Wallen, K. Sex differences in response to visual sexual stimuli: A review. *Arch. Sex. Behav.* **2008**, *37*, 206–218. [CrossRef]
13. Geer, J.H.; Bellard, H.S. Sexual content induced delays in unprimed lexical decisions: Gender and context effects. *Arch. Sex. Behav.* **1996**, *25*, 379–395. [CrossRef] [PubMed]
14. Geer, J.H.; Melton, J.S. Sexual content-induced delay with double-entendre words. *Arch. Sex. Behav.* **1997**, *26*, 295–316. [CrossRef] [PubMed]
15. Conaglen, H.M. Sexual content induced delay: A reexamination investigating relation to sexual desire. *Arch. Sex. Behav.* **2004**, *33*, 359–367. [CrossRef] [PubMed]
16. Geer, J.H.; Judice, S.; Jackson, S. Reading times for erotic material: The pause to reflect. *J. Gen. Psychology* **1994**, *121*, 345–352. [CrossRef]
17. Most, S.B.; Smith, S.D.; Cooter, A.B.; Levy, B.N.; Zald, D.H. The naked truth: Positive, arousing distractors impair rapid target perception. *Cogn. Emotion* **2007**, *21*, 964–981. [CrossRef]
18. Imhoff, R.; Barker, P.; Schmidt, A.F. To what extent do erotic images elicit visuospatial versus cognitive attentional processes? Consistent support for a (non-spatial) sexual content-induced delay. *Arch. Sex. Behav.* **2020**, *49*, 531–550. [CrossRef]
19. Carretié, L. Exogenous (automatic) attention to emotional stimuli: A review. *Cogn. Affect. Behav. Neurosci.* **2014**, *14*, 1228–1258. [CrossRef]
20. Codispoti, M.; De Cesarei, A.; Biondi, S.; Ferrari, V. The fate of unattended stimuli and emotional habituation: Behavioral interference and cortical changes. *Cogn. Affect. Behav. Neurosci.* **2016**, *16*, 1063–1073. [CrossRef]
21. Kagerer, S.; Wehrum, S.; Klucken, T.; Walter, B.; Vaitl, D.; Stark, R. Sex attracts: Investigating individual differences in attentional bias to sexual stimuli. *PLoS ONE* **2014**, *9*, e107795. [CrossRef] [PubMed]
22. Strahler, J.; Kruse, O.; Wehrum-Osinsky, S.; Klucken, T.; Stark, R. Neural correlates of gender differences in distractibility by sexual stimuli. *Neuroimage* **2018**, *176*, 499–509. [CrossRef] [PubMed]
23. Strahler, J.; Baranowski, A.; Walter, B.; Huebner, N.; Stark, R. Attentional bias toward and distractibility by sexual cues: A meta-analytic integration. *Neurosci. Biobehav. Rev.* **2019**, *105*, 276–287. [CrossRef] [PubMed]
24. Oliver, M.B.; Hyde, J.S. Gender differences in sexuality—A metaanalysis. *Psychol. Bull.* **1993**, *114*, 29–51. [CrossRef]
25. Frankenbach, J.; Weber, M.; Loschelder, D.D.; Kilger, H.; Friese, M. Sex drive: Theoretical conceptualization and meta-analytic review of gender differences. *Psychol. Bull.* **2022**, *148*, 621. [CrossRef]
26. MacKay, D.G.; Shafto, M.; Taylor, J.K.; Marian, D.E.; Abrams, L.; Dyer, J.R. Relations between emotion, memory, and attention: Evidence from taboo Stroop, lexical decision, and immediate memory tasks. *Memory Cogn.* **2004**, *32*, 474–488. [CrossRef]
27. Williams, L.J.; Evans, J.R. Evidence for perceptual defense using a lexical decision task. *Percept. Motor Skills* **1980**, *50*, 195–198. [CrossRef]
28. Brown, J.D.; L'Engle, K.L. X-rated: Sexual attitudes and behaviors associated with US early adolescents' exposure to sexually explicit media. *Commun. Res.* **2009**, *36*, 129–151. [CrossRef]
29. Morgan, E.M. Associations between young adults' use of sexually explicit materials and their sexual preferences, behaviors, and satisfaction. *J. Sex Res.* **2011**, *48*, 520–530. [CrossRef]
30. Wiemer, J.; Kurstak, S.; Sellmann, F.; Lindner, K. Sexual stimuli cause behavioral disinhibition in both men and women, but even more so in men. *Arch. Sex. Behav.* **2023**, *52*, 1445–1460. [CrossRef]
31. Chivers, M.L.; Rieger, G.; Latty, E.; Bailey, J.M. A sex difference in the specificity of sexual arousal. *Psychol. Sci.* **2004**, *15*, 736–744. [CrossRef] [PubMed]
32. Snowden, R.J.; Wichter, J.; Gray, N.S. Implicit and explicit measurements of sexual preference in gay and heterosexual men: A comparison of priming techniques and the implicit association task. *Arch. Sex. Behav.* **2008**, *37*, 558–565. [CrossRef] [PubMed]
33. Snowden, R.J.; Fitton, E.; McKinnon, A.; Gray, N.S. Sexual attraction to both genders in ambiphilic men: Evidence from implicit cognitions. *Arch. Sex. Behav.* **2020**, *49*, 503–515. [CrossRef]
34. Chivers, M.L. The specificity of women's sexual response and its relationship with sexual orientations: A review and ten hypotheses. *Arch. Sex. Behav.* **2017**, *46*, 1161–1179. [CrossRef]
35. Snowden, R.J.; Gray, N.S. Implicit Sexual Associations in Heterosexual and Homosexual Women and Men. *Arch. Sex. Behav.* **2013**, *42*, 475–485. [CrossRef]
36. Wright, L.W.; Adams, H.E. Assessment of sexual preference using a choice-reaction time task. *J. Psychopathol. Behav. Assess.* **1994**, *16*, 221–231. [CrossRef]
37. Wright, L.W.; Adams, H.E. The effects of stimuli that vary in erotic content on cognitive processes. *J. Sex Res.* **1999**, *36*, 145–151. [CrossRef]
38. Dawson, S.J.; Fretz, K.M.; Chivers, M.L. Visual attention patterns of women with androphilic and gynephilic sexual attractions. *Arch. Sex. Behav.* **2017**, *46*, 141–153. [CrossRef]
39. Snowden, R.J.; Curl, C.; Jobbins, K.; Lavington, C.; Gray, N.S. Automatic Direction of Spatial Attention to Male Versus Female Stimuli: A Comparison of Heterosexual Men and Women. *Arch. Sex. Behav.* **2016**, *45*, 843–853. [CrossRef]

40. Snowden, R.J.; Gray, N.S.; Rollings, J.; Uzzell, K.S. Automatic attention to sexual images of men and women in androphilic, ambiphilic, and gynephilic women. *J. Bisexuality* **2023**, *23*, 170–185. [CrossRef]
41. Lalumière, M.L.; Sawatsky, M.L.; Dawson, S.J.; Suschinsky, K.D. The empirical status of the preparation hypothesis: Explicating women's genital responses to sexual stimuli in the laboratory. *Arch. Sex. Behav.* **2020**, *5*, 1–20. [CrossRef] [PubMed]
42. Bradley, M.M.; Miccoli, L.; Escrig, M.A.; Lang, P.J. The pupil as a measure of emotional arousal and autonomic activation. *Psychophysiology* **2008**, *45*, 602–660. [CrossRef] [PubMed]
43. Snowden, R.J.; O'Farrell, K.R.; Burley, D.; Erichsen, J.T.; Newton, N.V.; Gray, N.S. The pupil's response to affective pictures: Role of image duration, habituation, and viewing mode. *Psychophysiology* **2016**, *53*, 1217–1223. [CrossRef]
44. Hess, E.H.; Polt, J.M. Pupil size as related to interest value of visual stimuli. *Science* **1960**, *132*, 349–350. [CrossRef]
45. Attard-Johnson, J.; Vasilev, M.R.; Ciardha, C.Ó.; Bindemann, M.; Babchishin, K.M. Measurement of sexual interests with pupillary responses: A meta-analysis. *Arch. Sex. Behav.* **2021**, *50*, 3385–3411. [CrossRef]
46. Finke, J.B.; Deuter, C.E.; Hengesch, X.; Schächinger, H. The time course of pupil dilation evoked by visual sexual stimuli: Exploring the underlying ANS mechanisms. *Psychophysiology* **2017**, *54*, 1444–1458. [CrossRef]
47. Sarlo, M.; Buodo, G. To each its own? Gender differences in affective, autonomic, and behavioral responses to same-sex and opposite-sex visual sexual stimuli. *Physiol. Behav.* **2017**, *171*, 249–255. [CrossRef]
48. Safron, A.; Sylva, D.; Klimaj, V.; Rosenthal, A.M.; Li, M.; Walter, M. Neural correlates of sexual orientation in heterosexual, bisexual, and homosexual men. *Sci. Rep.* **2017**, *7*, 413–414. [CrossRef]
49. Stark, R.; Schienle, A.; Girod, C.; Walter, B.; Kirsch, P.; Blecker, C.; Ott, U.; Schäfer, A.; Sammer, G.; Zimmermann, M.; et al. Erotic and disgust-inducing pictures—Differences in the hemodynamic responses of the brain. *Biol. Psychol.* **2005**, *70*, 19–29. [CrossRef]
50. Cisler, J.M.; Bacon, A.K.; Williams, N.L. Phenomenological characteristics of attentional biases towards threat: A critical review. *Cogn. Ther. Res.* **2009**, *33*, 221–234. [CrossRef]
51. Hedge, C.; Powell, G.; Sumner, P. The reliability paradox: Why robust cognitive tasks do not produce reliable individual differences. *Behav. Res. Methods* **2018**, *50*, 1166–1186. [CrossRef] [PubMed]
52. Parsons, S.; Kruijt, A.-W.; Fox, E. Psychological science needs a standard practice of reporting the reliability of cognitive-behavioral measurements. *Adv. Methods Pract. Psychol. Sci.* **2019**, *2*, 378–395. [CrossRef]
53. Lang, P.J.; Bradley, M.M.; Cuthbert, B.N. *International Affective Picture System (IAPS): Technical Manual and Affective Ratings*; Technical Report A-8; The Center for Research in Psychophysiology, University of Florida: Gainesville, FL, USA, 2008.
54. Marchewka, A.; Żurawski, Ł.; Jednoróg, K.; Grabowska, A. The Nencki Affective Picture System (NAPS): Introduction to a novel, standardized, wide-range, high-quality, realistic picture database. *Behav. Res. Methods* **2014**, *46*, 596–610. [CrossRef] [PubMed]
55. Kinsey, A.C.; Pomeroy, W.B.; Martin, C.E. *Sexual Behavior in the Human Male*; W. B. Saunders: Philadelphia, PA, USA, 1948.
56. Wagenmakers, E.J.; Brown, S. On the linear relation between the mean and the standard deviation of a response time distribution. *Psychol. Rev.* **2007**, *114*, 830–841. [CrossRef]
57. Grimshaw, G.M.; Kranz, L.S.; Carmel, D.; Moody, R.E.; Devue, C. Contrasting reactive and proactive control of emotional distraction. *Emotion* **2018**, *18*, 26–38. [CrossRef]
58. Sumner, P. Determinants of saccade latency. In *The Oxford Handbook of Eye Movements*; Oxford University Press: Oxford, UK, 2011; pp. 413–424.
59. Lambiase, J.; Reichert, T. Sex and the marketing of contemporary consumer magazines: How men's magazines sexualized their covers to compete with Maxim. In *Sex in Consumer Culture*; Routledge: London, UK, 2013; pp. 91–110.
60. Reichert, T. Sex in advertising research: A review of content, effects, and functions of sexual information in consumer advertising. *Annu. Rev. Sex Res.* **2002**, *13*, 241–273. [CrossRef]
61. Houwer, J.D.; Hermans, D. Differences in the affective processing of words and pictures. *Cogn. Emot.* **1994**, *8*, 1–20. [CrossRef]
62. Kensinger, E.A.; Schacter, D.L. Processing emotional pictures and words: Effects of valence and arousal. *Cogn. Affect. Behav. Neurosci.* **2006**, *6*, 110–126. [CrossRef]
63. Hinojosa, J.A.; Carretié, L.; Valcárcel, M.A.; Méndez-Bértolo, C.; Pozo, M.A. Electrophysiological differences in the processing of affective information in words and pictures. *Cogn. Affect. Behav. Neurosci.* **2009**, *9*, 173–189. [CrossRef]
64. Gronau, N.; Cohen, A.; Ben-Shakhar, G. Dissociations of personally significant and task-relevant distractors inside and outside the focus of attention: A combined behavioral and psychophysiological study. *J. Exp. Psychol. Gen.* **2003**, *132*, 512. [CrossRef]
65. Janssen, E.; Vorst, H.; Finn, P.; Bancroft, J. The Sexual Inhibition (SIS) and Sexual Excitation (SES) Scales: I. Measuring sexual inhibition and excitation proneness in men. *J. Sex Res.* **2002**, *39*, 114–126. [CrossRef] [PubMed]
66. Carpenter, D.; Janssen, E.; Graham, C.; Vorst, H.; Wicherts, J. Women's scores on the Sexual Inhibition/Sexual Excitation Scales (SIS/SES): Gender similarities and differences. *J. Sex Res.* **2008**, *45*, 36–48. [CrossRef] [PubMed]
67. Carvalho, J.; Czop, O.; Rocha, M.; Nobre, P.; Soares, S. Gender differences in the automatic attention to romantic vs sexually explicit stimuli. *J. Sex. Med.* **2018**, *15*, 1083–1092. [CrossRef] [PubMed]
68. Zuckerman, M.; Kolin, E.A.; Price, L.; Zoob, I. Development of a sensation-seeking scale. *J. Consult. Psychol.* **1964**, *28*, 477–482. [CrossRef]
69. Micucci, A.; Ferrari, V.; De Cesarei, A.; Codispoti, M. Contextual modulation of emotional distraction: Attentional capture and motivational significance. *J. Cogn. Neurosci.* **2020**, *32*, 621–633. [CrossRef]
70. Snowden, R.J.; Gray, N.S.; Uzzell, K.S. Implicit sexual cognitions in women with ambiphilic sexual attractions: A comparison to androphilic and gynephilic women. *Arch. Sex. Behav.* **2024**, *53*, 141–152. [CrossRef]

71. Timmers, A.D.; Blumenstock, S.M.; DeBruine, L.; Chivers, M.L. The role of attractiveness in gendered sexual response patterns. *J. Sex Res.* **2023**. *online ahead of print*. [CrossRef]
72. Spape, J.; Timmers, A.D.; Yoon, S.; Ponseti, J.; Chivers, M.L. Gender-specific genital and subjective sexual arousal to prepotent sexual features in heterosexual women and men. *Biol. Psychol.* **2014**, *102*, 1–9. [CrossRef]
73. Yoon, J.; Knight, R.A. Sexual material perception in sexually coercive men: Disattending deficit and its covariates. *Sex. Abuse* **2011**, *23*, 275–291. [CrossRef]